National Aeronautics and
Space Administration

**Goddard Space Flight Center**
Greenbelt, Maryland
20771

NASA

October 5, 1982

Navel
any comments
before we send
this ?

Reply to Attn of: 663

Dr. R. E. Vogt
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Pasadena, CA 91125

Dear Robbie:

Your question regarding the Voyager CRS performance, the following observations will help characterize the CRS problem for you. As you know, the problem affects Block I only, and is evident by the appearence of a well defined 45° line in those two-dimen ional PHA distributions involving PHA 2. This line is 4 or 5 channels wide and has intercept at about channel 10. The normal particle lines appear to be transposed onto the 45° line wherever the nominal distribution would lie below the diagonal line. All rates, including those accosiated with the PHA events, are normal; the PHA distributions for all three telescopes associated with Block I are distorted. As you recall each of the three PHA's (PHA 1, PHA 2, and PHA 3) analyze pulses from one of several detectors, depending on event type. The malfunction is limited to PHA 2, and appears to force that parameter to exhibit a channel number that is 10 channels greater than the larger of either PHA 1 or PHA 3. The attached block diagram which is greatly simplified, depicts the relevant portions of the system.

There are three ways in which PHA 2 could conceivably take on a value of the larger of PHA 1 or 3, but none of these immediately and obviously explain why an additional 10 channels are added. The three explanations (see attached figure) are:

1. An open circuit in the SHB signal between the analog board and the digital board.

2. A shorted transistor in the "OR" gate (Q2) which allows the OR of SHA and SHC to overpower the SHB signal.

3. A malfunction in the COSMOS gate prior to the address counter.

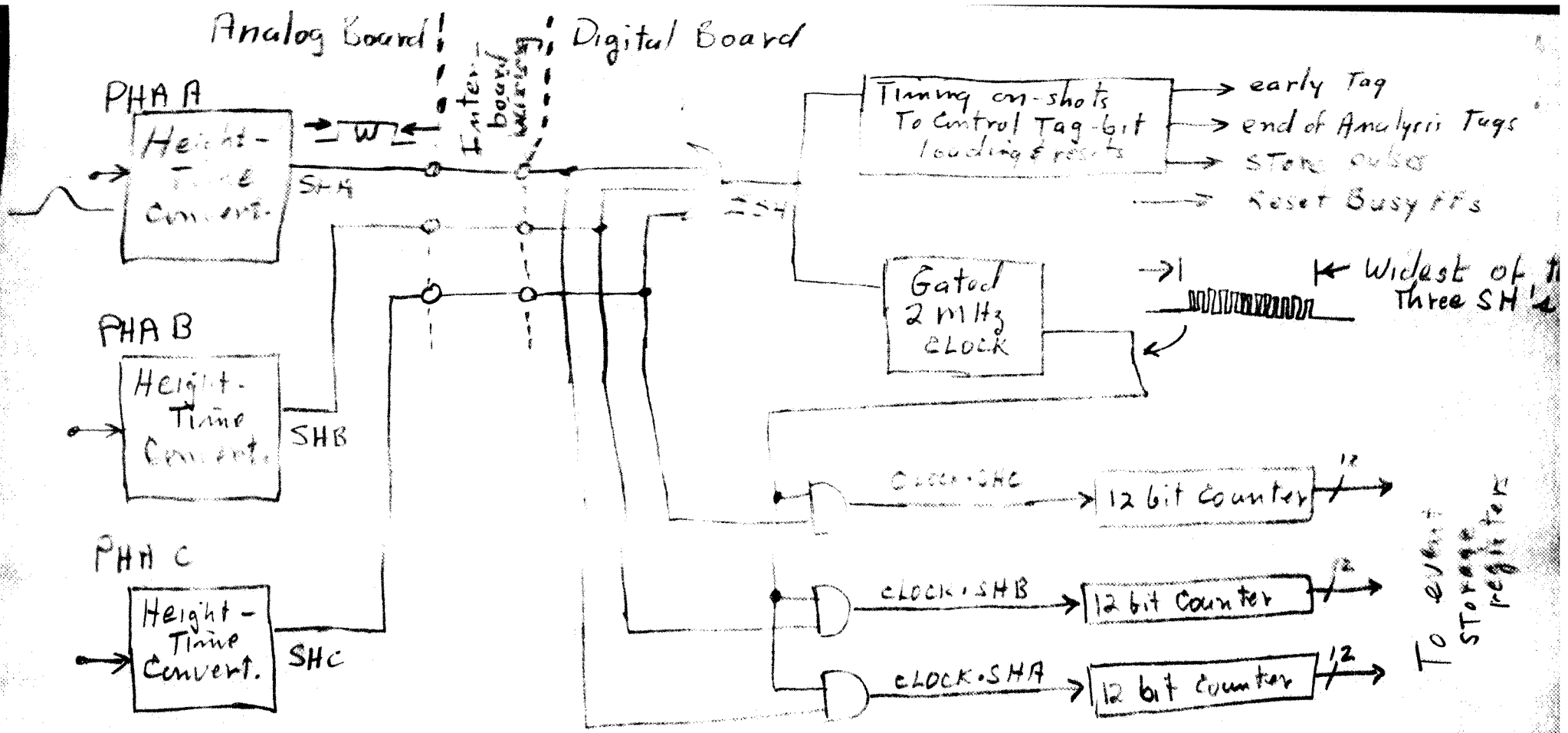
There could well be other mechanisms that would produce the same result. Item 3 above is probably the most unlikely. Either 1 or 2 are plausible kinds of failures, but the exact effect of either is diffcult to predict without bread-boarding portions of the circuitry, particularly with regard to the 10-channel add-on feature.

We are in the process of locating parts to complete a mini-breadboard, and will keep you informed of the results.

Best Regards,

Don

Donald E. Stilwell, Head
Instrumentation Branch



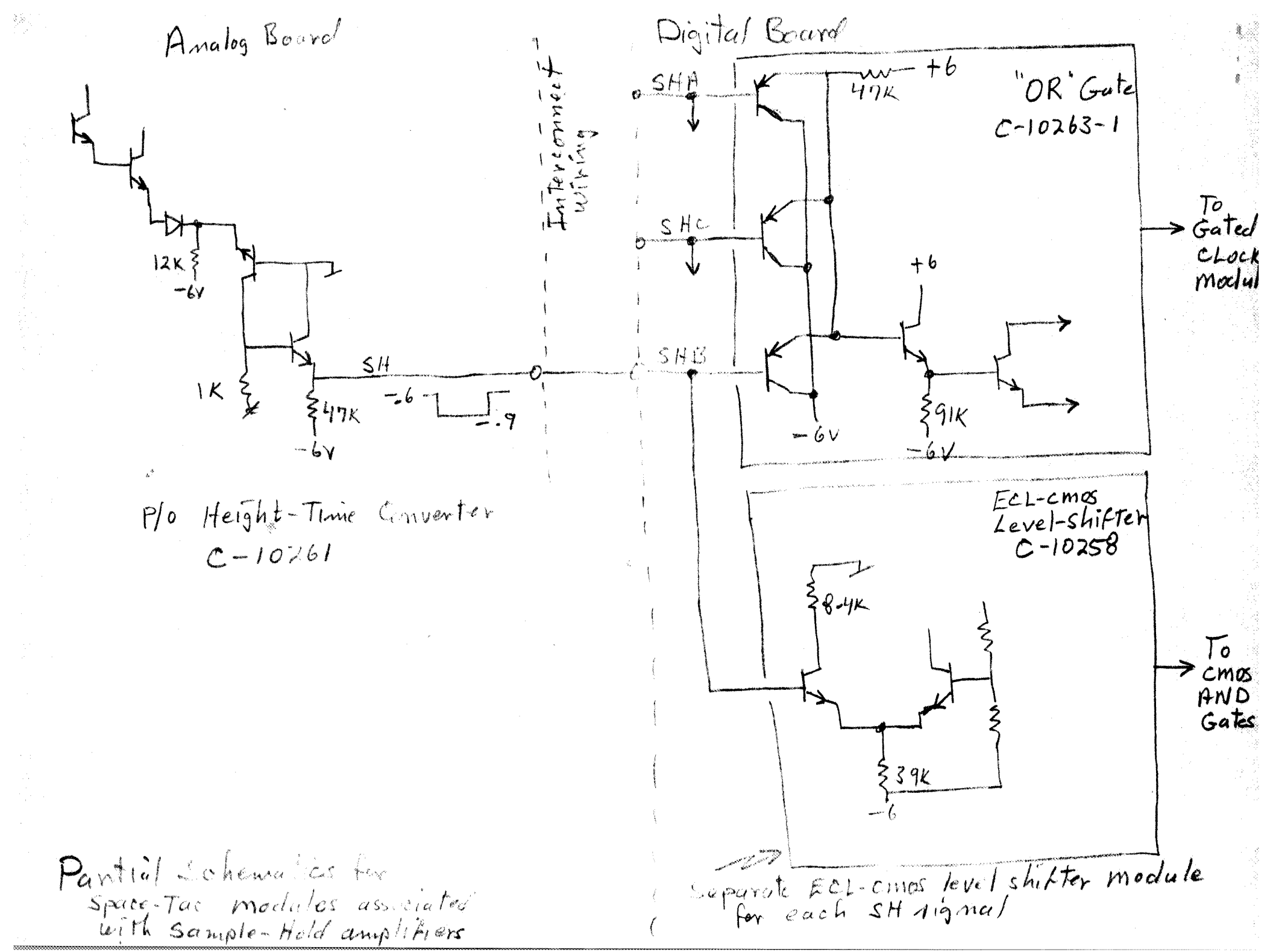

W ≈ Pulse height

ΣSH envelopes all three SH signals

All Signals at ECL levels (−0.6 V & −0.9V) except for CLOCK·SH gates & counters, which are CMOS (0 & 10V)

Fig 1

Simplified Voyager PHA Block Diagram




Partial Schematics for Space-Tac modules associated with Sample-Hold amplifiers